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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,735	07/28/2003	David John Zanzig	DN2002132	4025

27280 7590 10/21/2005

THE GOODYEAR TIRE & RUBBER COMPANY  
INTELLECTUAL PROPERTY DEPARTMENT 823  
1144 EAST MARKET STREET  
AKRON, OH 44316-0001

EXAMINER

SANDERS, KRIELLION ANTIONETTE

ART UNIT	PAPER NUMBER
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1714

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/628,735

Applicant(s)

ZANZIG ET AL.

Examiner

Kriellion A. Sanders

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                                                  |                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                      | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                             | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>11/03, 7/03</u> . | 6) <input type="checkbox"/> Other: ____.                                                |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1- 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Labauze, US Patent No. 6071995 in view of Cabioch et al, US Patent No. 6013718 and Mabry et al, 6,075,084.

Labauze discloses a vulcanizable rubber composition comprising at least one functionalized or modified diene polymer, carbon black having silica fixed to its surface as a reinforcing filler, and other conventional constituents of such compositions, characterized in that the diene polymer is a functionalized diene polymer comprising a polysiloxane block having a silanol end, or a diene polymer modified along its chain by silanol functions. The resulting compositions have improved hysteretic and physical properties in comparison to compositions based on non-functionalized diene polymers having carbon black therein. The improved properties are said to be equivalent to compositions based on functionalized or non-functionalized diene polymers comprising a linking agent and silica as reinforcing filler, and, furthermore, show a distinct increase in electric conductivity in comparison to the latter compositions.

The patented invention also contemplates the use of butadiene/styrene copolymers as the diene component of the modified diene polymer. The reactants of the styrene/butadiene elastomer of the patented invention would result in the elastomers that correspond to those of applicant's formula (I) and (IA). According to the patented invention, the silanol-functionalized or modified diene polymer may be used alone or in a blend with any other elastomer conventionally used in tires including another diene polymer possibly coupled and/or starred or even partially or completely functionalized with a function other than the silanol function. It is evident that the higher the proportion of conventional elastomer is in the composition according to the invention, the less its properties will be improved. This is why a conventional elastomer may be present in an amount between 1 and 50 parts by weight per 100 parts of weight of silanol-functionalized or

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modified polymer. Therefore, patentee indicates that it is advantageous to include an additional diene polymer in the resin compositions.

The compositions of the patented invention further contain carbon black having silica fixed to its surface as a reinforcing filler. The proportion of carbon black having silica fixed to its surface is at least 30 parts by weight of the polymer. Said carbon black having silica fixed to its surface may be used in a blend with other reinforcing fillers such as carbon black or white fillers, notably silica. The relative percentage of these fillers may be adjusted on the basis of the property compromise of the compositions desired by persons skilled in the art. The amount of silica present on the surface of the carbon black represents from 0.1 to 50% by weight, preferably from 0.3 to 30% by weight. Examples of silica suitable for use in the present invention are all precipitated or fumed silicas known to persons skilled in the art, and the highly dispersible silicas in particular. Suitable for use as carbon blacks are all carbon blacks that are commercially available or are conventionally used in tires, and particularly in tire treads.

In addition to one or more diene polymers and the carbon black having silica fixed to its surface, the compositions according to the patented invention may contain all or some of the other constituents and additives conventionally used in rubber blends such as plasticizers, pigments, antioxidants, antiozonant waxes, a vulcanization system based either on sulfur and/or peroxide and/or bismaleimides, vulcanization accelerators, expansion oils, or *agents of linking with the elastomer and/or silica coating agents such as alkoxysilanes*, polyols, amines, etc. The patented invention also relates to treads of tires and of tires of reduced rolling resistance.

See col. 2, line 37 through col. 3, line 65 and col. 5, line 60 through col. 6, line 67.

Patentee provides the generic teaching for combining the silane modified and non-modified styrene/butadiene polymers in conjunction with reinforcements of silica and carbon black. Patentee is silent as to the particulars of these components such as the molecular weight and CTAB value and BET. However, in view of the range of possible combinations of species of styrene/butadiene copolymers and silica and carbon black reinforcements, it would have been obvious to the ordinary practitioner of this art at the time of applicant's invention to select those specific species of components from within the teachings of the Labauze reference that would provide the most optimal properties for the intended end use of tire or tire tread manufacture. This is particularly evident from the teachings of Cabioch et al at col. 5, line 54 through col. 6, line 62.

Cabioch et al recognizes the advantageous improvements in reduced hysteresis and rolling resistance to be attributed to the use of silica reinforcements having specific CTAB and BET values. As nonlimiting examples of such preferred, highly dispersible silicas may be mentioned which have a CTAB surface equal to or lower than 450 m<sup>2</sup>/g. However, preference, the silicas which are suitable have a CTAB specific surface of between 120 and 200 m<sup>2</sup>/g, preferably between 145 and 180 m<sup>2</sup>/g, a BET specific surface of between 120 and 200 m<sup>2</sup>/g,

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preferably between 150 and 190 m<sup>2</sup>/g. The ordinary practitioner in this art would then find it obvious to employ reinforcing materials within these stated ranges.

Mabry et al would further document the obviousness of selecting species of components having particular properties. Mabry et al states that it is well known to employ carbon blacks having higher or lower structure and surface area to manipulate the performance characteristics of an elastomeric composition. Carbon blacks of higher surface area and lower structure are known to improve crack growth resistance and cut-and-chip resistance as well as, generally, abrasion resistance, and other performance qualities. For typical **carbon black** loading levels in natural rubber, such as 45 phr to 75 phr, and oil loading from 0 phr to 10 phr, low structure carbon blacks, such as carbon blacks of DBPA less than 110 cc/100 g, particularly those having surface area above about 45 m<sup>2</sup>/g to 65 m<sup>2</sup>/g (**CTAB**), it has not been possible to achieve compounds having less than about 1% undispersed **carbon black** (measured as macro-dispersion, as described below) regardless of the duration and intensity level of mixing. Furthermore, while theoretical analysis has indicated desirable improvements in certain performance characteristics of elastomeric compositions employing carbon blacks of higher surface area and lower structure, it has not been possible using known physical milling or other mastication processes to obtain such elastomeric compositions in which both the molecular weight of the natural rubber is well preserved and satisfactory macro-dispersion levels of the **carbon black** are achieved. Generally, it has been found, for example, that the elastomer reinforcing properties of a **carbon black** increase as the particle size of the carbon black decreases. Mabry et al discloses elastomeric composite blends having acceptable macro-dispersion levels attributable to the particulate filler, molecular weight of the elastomer, particulate loading level, choice of particulate filler (including, for example, **carbon black** fillers of exceptionally high surface area and low structure) and/or other characteristics. The, preferred elastomer composite blends disclosed therein are said to have excellent macro-dispersion, even of certain fillers, such as carbon blacks having a structure to surface area ratio DBP:CTAB less than 1.2 and even less than 1, in elastomers such as natural rubber, etc. with little or no degradation of the molecular weight of the elastomer. The elastomer composite blends of Mabry et al comprising natural rubber, the molecular weight of the natural rubber, that is, the MW.sub.sol (weight average) of the sol portion, preferably is at least about 300,000, more preferably at least about 400,000, being in certain preferred embodiments between 400,000 and 900,000. The elastomer composite blends optionally comprise extender oil, such as about 0 to 20 phr, more preferably about 0 to 10 phr extender oil, and/or other ingredients such as are well known for optional use in compounding natural rubber and/or other elastomers with **carbon black** and/or other fillers. The elastomeric composite blends of Mabry et al are said to provide highly desirable physical properties and performance characteristics. See col. 4, line 46 through col. 5, line 50.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kriellion A. Sanders whose telephone number is 571-272-1122.

The examiner can normally be reached on Monday through Thursday 6:30-7:00.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on 571-272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kriellion A. Sanders  
Primary Examiner  
Art Unit 1714

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